

CLAIMS

What is claimed is:

1. A method, comprising:

establishing first atomic layer deposition (ALD) conditions for depositing a film on a substrate;

growing at least one first monolayer of the film using the first ALD conditions, the first monolayer having first properties;

establishing subsequent ALD conditions for depositing the film;  
and

growing at least one subsequent monolayer of the film on the first monolayers using the subsequent ALD conditions.

2. The method of claim 1, wherein establishing first ALD conditions comprises establishing a first ALD reactor temperature.

3. The method of claim 2, wherein establishing subsequent ALD conditions comprises establishing at least one subsequent ALD reactor temperature different from the first ALD reactor temperature.

4. The method of claim 1, wherein establishing first ALD conditions comprises establishing a first reactant flow rate.

5. The method of claim 4, wherein establishing subsequent ALD conditions comprises establishing at least one subsequent reactant flow rate different from the first reactant flow rate.

6. An article of manufacture, comprising:

a machine-accessible including data that, when accessed by a machine, cause the machine to perform the operations comprising:

establishing first atomic layer deposition (ALD) conditions for depositing a film on a substrate;

growing at least one first monolayer of the film using the first ALD conditions, the first monolayer having first properties;

establishing subsequent ALD conditions for depositing the film; and

growing at least one subsequent monolayer of the film on the first monolayer using the subsequent ALD conditions.

7. The article of manufacture of claim 6, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising establishing a first ALD reactor temperature.

8. The article of manufacture of claim 7, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising establishing at least one subsequent ALD reactor temperature different from the first ALD reactor temperature.

9. The article of manufacture of claim 6, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising establishing a first reactant flow rate.

10. The article of manufacture of claim 9, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising establishing at least one subsequent reactant flow rate different from the first reactant flow rate.

11. An apparatus, comprising:

an atomic layer deposition (ALD) reactor; and

a controller coupled to the ALD reactor to establish first atomic layer deposition (ALD) conditions for depositing a film on a substrate, to grow at least one first monolayer of the film on the substrate using the first ALD conditions, to establish at least one subsequent ALD condition for depositing

the film, and to grow at least one subsequent monolayer of the film on the first monolayers using the subsequent ALD conditions.

12. The apparatus of claim 11, wherein the controller is further coupled to establish first and subsequent ALD conditions in an incremental manner.

13. The apparatus of claim 11, wherein the controller is further coupled to establish first and subsequent ALD conditions in a continuous manner.

14. The apparatus of claim 11, wherein the controller is coupled to control the flow rate of a first reactant and a second reactant into the reactor.

15. The apparatus of claim 14, wherein the first reactant is an oxygen-based reactant.

16. The apparatus of claim 14, wherein the first reactant is a nitrogen-based reactant.

17. The apparatus of claim 11, wherein the controller is coupled to control the temperature the reactor.

18. An apparatus, comprising:

a substrate;

a layer of material disposed on the substrate, the layer having at least one first monolayer in contact with the substrate, the at least one first monolayer having at least one first electrical property, the layer having at least one subsequent monolayer disposed on the at least one first monolayer, the at least one subsequent monolayer having at least one subsequent electrical property different from the at least one subsequent first electrical property.

19. The apparatus of claim 18, further comprising a gate electrode disposed on the layer.

20. The apparatus of claim 19, further comprising first and second vertical sidewall dielectric spacers formed on first and second sides of the layer and first and second sides of the gate electrode, respectively.

21. The apparatus of claim 20, further comprising first and second shallow trench isolation (STI) regions formed in the substrate.

22. A system, comprising:

a transponder comprising a substrate and a layer of material disposed on the substrate, the layer having at least one first monolayer in contact with the substrate, the at least one first monolayer having first electrical property, the layer having at least one subsequent monolayer disposed on the at least one first monolayer, the at least one subsequent monolayer having at least one subsequent electrical property different from the at least one first electrical property; and

an erbium-doped fiber amplifier (EDFA) coupled to the transponder.

23. The system of claim 22, further comprising a multiplexer coupled to the EDFA.

24. The system of claim 23, further comprising an add-drop multiplexer coupled to the EDFA.